

Phytolith and Geochemical Preservation in Bedouin Camps at Wadi Faynan, Jordan



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Introduction

The application of geochemical and phytolith analysis of soil samples to identify spatial activity patterns at archaeological sites in recent studies has provided fruitful insights into social use of space. However, problems of equifinality and the complexities involved in accounting for various taphonomic processes that have influenced the studied anthropogenic soils limit the accuracy and extent of interpretation possible today.

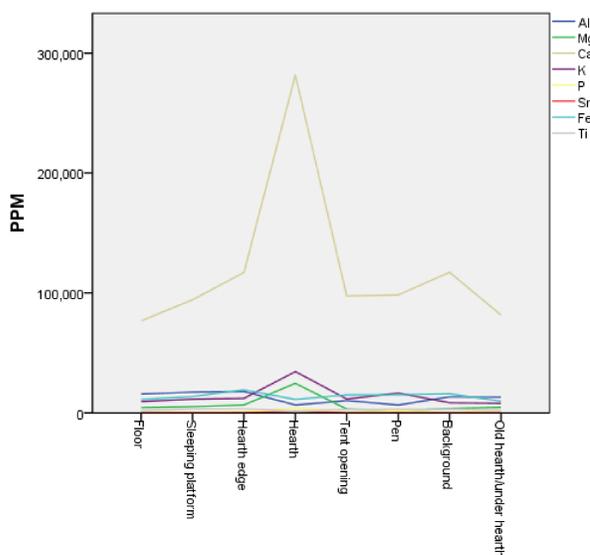
By applying a combined geochemical and phytolith method for identifying activity areas to samples from abandoned Bedouin campsites in Wadi Faynan, Jordan, this project aims to contribute to our understanding of the potential this method carries and the formation and dissolution of geochemical and phytolith signatures in anthropogenic soils. This combined technique will then be applied to soil samples that have been collected from the Neolithic sites of Wadi el-Jilat, Jordan.

Background

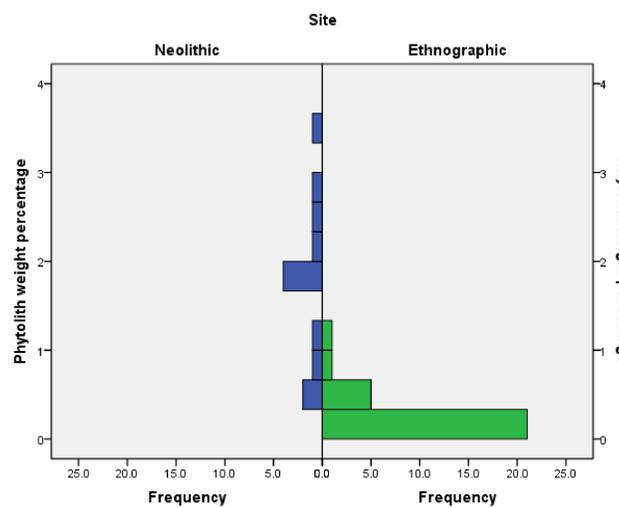
The ethnographic data that is examined in this project was collected during an ethnoarchaeological survey of Bedouin campsites at Wadi Faynan, Jordan, which was carried out by Carol Palmer and Helen Smith during 1999 and 2000. The samples were taken from camps at various stages of abandonment (varying from six months to 30 years). Considering the patterns of abandonment and occupation at these sites would allow for a study of both taphonomic processes and the potential involved in utilising geochemical and phytolith soil signatures to identify activity areas.

Soil samples from the Neolithic sites of Wadi el-Jilat will form the archaeological data. Fieldwork at these sites was part of a series of excavations at the Azraq Basin during the 1980s under the direction of Dr. Andrew Garrard. The combined phytolith and geochemical method will be applied to these in order to test its efficacy.

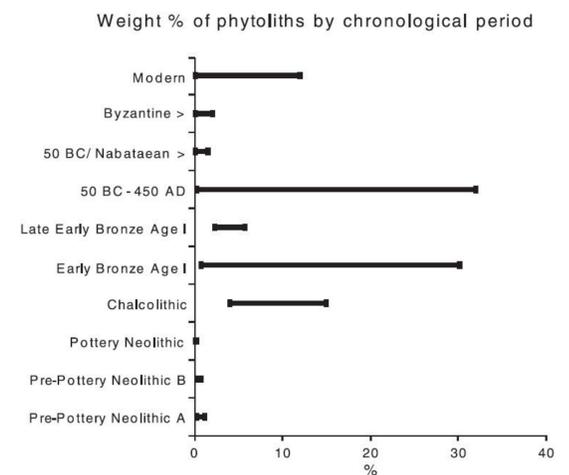
Results of geochemical analysis of ethnographic samples according to context



Percentage of phytolith weight within the dry sample weight for ethnographic and Neolithic sites



Weight percent of phytoliths by chronological period in a previous ethnographic study at Wadi Faynan



(from Jenkins *et al.* 2011, p.393)

Methodology

A portable XRF handheld scanner (pXRF) is used for the geochemical analysis, and selected samples will be further analysed using an ICP/AES device. In addition, the samples are examined for phytolith content using the dry ashing method. The phytolith identification will be aided by the creation of a Jordanian phytolith reference collection, which is currently being undertaken at Bournemouth University.

The data represented in the graphs above is based on a preliminary test of the ethnographic data. The geochemical analysis shown in the left graph was performed using a pXRF. The relative amount of phytolith material in the ethnographic and archaeological data was calculated by dividing the weight of phytoliths extracted at the end of the laboratory procedure by the weight of the dry sample. The same method was applied to the data that is shown in the graph on the right (the category "modern" representing occupied Bedouin tents). The shortcomings and advantages of this approach are discussed in the publication by Jenkins *et al.* 2011.

Initial Results

The preliminary results of the ethnographic analysis suggest that activity patterns at abandoned campsites in the form of phytolith and geochemical soil signatures can have a very rapid pace of deterioration.

Compared to the amount of phytolith material that had been retrieved from occupied Bedouin tents in Wadi Faynan (Jenkins *et al.* 2011), and even to the percentage of the phytoliths in the Neolithic samples examined in this study (which falls within expected quantities), the abandoned campsites produced very little phytoliths. In addition, no difference in phytolith weight was found between the background samples and those from occupation contexts. The preliminary results of the geochemical analysis of the abandoned campsites show that hearth contexts are the only ones that show a significant difference from the background samples.

Further analysis will help determine the nature of the preservation of phytolith and geochemical soil signatures at ephemeral sites and the role played by abandonment processes.

Reference:

Jenkins, E.L., Baker, A. and Elliott, S., 2011. Past plant use in Jordan as revealed by archaeological and ethnoarchaeological phytolith signatures. In: Mithen, S.J. and Black, E., eds. *Water, life and civilisation: climate, environment and society in the Jordan Valley*. Cambridge: Cambridge University Press, pp. 381-399.

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